

REMARKS

Amendments to the Claims

In addition to any amendments discussed below, the independent claims have been amended to recite the clay is a “swellable” clay. Support is found on page 10, line 28- page 11, line 6 of the original specification.

Objection to the Claims

Claim 30, 32, and 35 are objected to for failing to further limit the claimed subject matter.

Claims 30 and 32 have been cancelled. As noted by the Examiner, the subject matter of these claims has been incorporated into claim 22. Claim 35 has been reviewed and amended to ensure that the specific recited polymers are within the scope of the elastomer of claim 22.

35 U.S.C. §112, second paragraph

Numerous claims were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 and 22 are held to be unclear as it is unclear if the polymer is intended to contain all three cited comonomers. In the interest of prosecution, the Office examined the claims based on “styrenic and/or substituted styrenic derived units.” Applicants believe this to be an acceptable interpretation based on page 6, lines 30-32 of the original specification. The claims have been reviewed and amended for clarity; the amendments being support by pg 6, lines 30-32 of the specification.

In the rejection, claims 19 and 35 are noted as citing copolymers that do not include any of the cited monomers of their respective independent claims. For claim 19, it recites ‘secondary’ rubbers to be added to the nanocomposite and thus the recited copolymers need not contain the monomers cited in claim 1. For claim 35, this claim has been amended as noted above to ensure proper claim scope.

Claims 1, 22, and 32 have been held unclear as it is uncertain if all or just some of the styrenic units are present in the cited amount. Based on pg 6 of the specification, it is all of the styrenic derived units present, whether substituted or not. Claims 1 and 22 have been amended. Claim 32 has been cancelled.

Numerous claims have been cited as improperly recited Markush groups. The claims have been reviewed and amended accordingly.

35 U.S.C. § 103

All pending claims stand rejected under 35 U.S.C. § 103 as being obvious over Arjunan (US 5700871) in view of Elspass (US 5807629). To the extent the amended claims are deemed unpatentable over the cited prior art, these rejections are traversed for the following reasons.

Arjunan is directed towards functionalizing a specific isooolefin and alkylstyrene copolymer with a carboxylic acid so that the copolymer may be blended with dissimilar elastomers (col 3, lines 23-40; col 4, line 40 – col 5, line 21); thereby achieving a multi-rubber blend with desired characteristics. The carboxylic acids includes polycarboxylic acids and derivatives thereof such as maileic acid, fumaric acid, and anhydrides. After the preferred isobutylene/paramethyl styrene copolymer is grafted with the acid, it is then added to a dissimilar elastomer and then compounded to include the conventional elastomeric/rubber additives such as fillers, plasticizers, and cure packages (col 7 – col 8, line 24).

Arjunan fails to teach a) adding a swellable (i.e. layered) clay or b) adding such a clay to the functionalized copolymer prior to blending the copolymer with the dissimilar elastomer. To remedy this deficiency, the teachings of Elspass are cited.

Elspass discloses a nanocomposite based on natural and isobutylene based polymers. Elspass discloses the use of styrene containing monomers, and substituted styrenic monomers; such polymers are preferably functionalized with halogens. Elspass and Arjunan have the commonality of copolymers of isobutylene and paramethyl-styrene (though Elspass prefers halogenated copolymers). Elspass, in the examples teaches sulfonating and acrylating the

styrene-containing copolymers, but is silent about the use of either maleates or anhydrides.

In the rejection, it is held that it would have been obvious to utilize the organo-clay of Elpass in the compound of Arjunan to prepare a nanocomposite with improved mechanical and gas permeability properties. Applicants disagree.

To establish *prima facie* obviousness, there 1) must be some suggestion or motivation in the art to modify or combine the references; 2) must be a reasonable expectation of success and 3) the combined references must teach or suggest all the claim limitations. *Graham v. Deere*

As noted above, Arjunan teaches the grafting of the styrene containing copolymer so that it may better bond with the dissimilar elastomer – see the examples and how the addition of just 10 wt % of the grafted I-PMS copolymer improved the dispersion and domain size in the blend (col 9 of Arjunan). Prior to adding additional components to the grafted I-PMS copolymer, one skilled in the art would be concerned with how any additional components would affect the ability of the grafted compound to achieve the desired dispersion in the blend. As Elpass teaches that the clay is an amine modified clay, if added to the grafted compound, would this disrupt the desired dispersion of Arjunan? Because of this interaction of the grafting compound of Arjunan and the swelling agents of the clay, which could negatively impact the blending of Arjunan, Applicants respectfully assert that there is no reasonable expectation of success in the compound of Arjunan and is actually potentially contrary and destructive to the teachings of Arjunan such that one skill in the art would not be motivated to attempt to add the clay of Elpass to the grafted I-PMS of Arjunan.

The court in KSR reiterated that a patent is composed of several elements and is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. *KSR International Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1741 (2007). A reason for the combination is still an important consideration, even though it need not be a rigid formula, nor "a formalistic conception." While the Office has provided a reason to try, the courts have held numerous times that 'obvious to try' is not the standard of 35 USC 103, *in re Tomlinson*, 53 CCPA 1421, 363 F.2d 928, 150 USPQ 623 (1966), and the

invention as obtained by the combination of the prior art – i.e. the perceived invention as directed by the prior art, must also be considered and whether there is the reasonable expectation of success as required by *Graham v. Deere*.

As argued above by Applicants, due to potential chemical interactions between the grafting agent of Arjunan and the swelling agent on the clay of Elspass, which may negatively impact Arjunan's desired ability of the I-PMS to graft and blend with the dissimilar rubber, one skilled in the art would not be motivated to combine the teachings of Elspass and Arjunan as set forth in the Office Action.

It is respectfully requested that this rejection be reconsidered and withdrawn.

In light of this amendment, Applicants are of the position that all of the claims now pending in the subject patent application are allowable. Thus, the Examiner is respectfully requested to allow all pending claims. If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated, since this should expedite the prosecution of the application for all concerned.

Respectfully submitted,

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Date

/Nancy T. Krawczyk/
Nancy T Krawczyk
Attorney for Applicants
Registration No. 38,744

ExxonMobil Chemical Co.
Law Technology
P.O. Box 2149
Baytown, Texas 77522-2149
Phone: 281-834-2429
Fax: 281-834-2495